MODIFICATIONS OF THE COMPREHENSIVE METHOD FOR TOTAL GLYCOALKALOID DETERMINATION[1]

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Abstract

Continuing investigations and queries from workers in the field of potato research have led to minor modifications of the method for the determination of total potato glycoalkaloids (TGA) by Fitzpatrick and Osman (1). These small changes shorten the time for analysis and can possibly give improved recovery of TGA.

Resumen

Investigaciones continuadas y discusiones con trabajadores en el campo de la investigación en papa han conducido a modificaciones menores del método para la determinación de glicoalcaloides totales de la papa (TGA) de Fitzpatrick y Osman (1). Esos cambios pequeños acortan el tiempo para análisis y posiblemente pueden dar una recuperación mejorada de TGA.

Materials and Methods

In the original method, duplicate aliquots of the methanolic glycoalkaloid extract were evaporated to dryness, redissolved in methanol, and filtered to remove sodium sulfate. We have found that losses of glycoalkaloids of up to 10-20% may occur at this point if rigorous ultrasonication is not carried out to physically free the glycoalkaloids from the sodium sulfate.

For most applications it is not necessary to remove the sodium sulfate, therefore, we have eliminated the dissolution in methanol and filtration of the sodium sulfate from the procedure. In the modified method, the aliquots of the methanolic glycoalkaloid extract are evaporated to dryness, dissolved in 15 ml of 2 N H_2SO_4, and hydrolyzed as previously reported (1). Sufficient NaOH should be added to these hydrolysates to bring the pH to at least 10, thus insuring that the aglycones are completely in the free base form.

In the original method (1) it was suggested that tomatine, because of its commercial availability, could be used as a titration standard. If other glycoalkaloid standards are desired, small quantities of solanine and

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chaconine may be obtained by slicing potatoes and storing these slices in the dark at room temperature for four days in order to greatly elevate the glycoalkaloid content (2, 3, 4). These can then be extracted with the methanol-chloroform bisolvent system as described in the original method (1).

The methanolic layer is concentrated to about 2/3 volume and made alkaline (>pH 10) with NH_4OH to precipitate the glycoalkaloids. Upon digestion at *ca.* 70 C for 30 min, cooling and centrifugation, this procedure should yield *ca.* 200-300 mg TGA/100 g fresh weight of tuber. The TGA consists primarily of α-solanine and α-chaconine in approximately equal parts. These compounds are separated by preparative TLC on silica gel plates by developing with the chloroform containing layer of a solvent system consisting of 2 parts methanol, 2 parts chloroform, and 1 part 1% NH_4OH.

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